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APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.
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PATENT AND TRADEMARK DIVISION
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EXAMINER

VOLLANO, J

ART UNIT	PAPER NUMBER
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1204

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DATE MAILED: 10/24/96

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

OFFICE ACTION SUMMARY

- ☐ Responsive to communication(s) filed on _____
- ☐ This action is FINAL.
- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 D.C. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire Three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

- ☒ Claim(s) 1-49 is/are pending in the application.
- Of the above, claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 1-15, 21-25, 30-35, 40-45 is/are rejected.
- ☐ Claim(s) 16-20, 26-29, 36-39, 46-48 is/are objected to.
- ☐ Claims _____ are subject to restriction or election requirement.

Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
- ☐ received.
- ☐ received in Application No. (Series Code/Serial Number) _____
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

- ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- ☒ Notice of Reference Cited, PTO-892
- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2
- ☐ Interview Summary, PTO-413
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Notice of Informal Patent Application, PTO-152

- SEE OFFICE ACTION ON THE FOLLOWING PAGES -

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DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-5 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent 4,528,408 to Plummer in view of EP 549,900 to Rohrmann and "Organic Chemistry" by Morrison and Boyd.

Plummer discloses a process according to the instant claims where a ketone is reacted with a reducing agent, an ether and a source of hydrogen to produce the corresponding alcohol. Plummer further discloses the use of lithium aluminum hydride as the reducing agent, THF as the ether in the reaction mixture and water as a source of hydrogen or OH containing compound (col 6, lines 56-64). Plummer does not disclose the use of sodium borohydride as the reducing agent. Plummer's process also differs from the instant process in the use of a specific ketone. Plummer discloses a 2,3-disubstituted indanone (col 6, line 36) whereas the instant invention uses a 2-substituted-4,5-benzoinstanone. Rohrmann discloses a process where a 2-substituted-4,5-benzoinstanone is reduced to the corresponding alcohol using an inert solvent such as THF or

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diethylether and a reducing agent of such as lithium aluminum hydride or sodium borohydride (pg 9 lines 12-13). Morrison and Boyd in their textbook "Organic Chemistry" (page 630) teach that after reduction of a ketone by either lithium aluminum hydride or sodium borohydride there should be a source of hydrogen to produce the alcohol and that one source can be water. It would be obvious to anyone skilled in the art at the time of the instant invention to use the 2-substituted-4,5-benzoindanone of Rohrmann in place of the substituted indanone of the Plummer's process since both compounds are cyclic ketones. It would further be obvious to anyone skilled in the art in view of Morrison and Boyd to use sodium borohydride in place of lithium aluminum hydride as the reducing agent in the Plummer's process.

3. Claims 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 549,900 to Rohrmann in view of Morrison and Boyd.

Rohrmann discloses the reduction of a 2-methyl substituted-4,5-benzoindanone where the ketone is in the 1 position on the ring where the predominate ether is THF and the reducing agent is sodium borohydride. Rohrmann fails to disclose the reduction of a 2 methyl-substituted-4,5-benzoindanone where the ketone is in the 3 position. Morrison and Boyd (page 628-629) teach that the reactivity of a ketone being reduced to an alcohol has a dependency on the functional groups on both sides of the ketone. Both the 1 and 3 position on the ring have essentially equivalent chemical environments and thus the positions are functionally homologous. Therefore it would be obvious to anyone skilled in the art in view of Morrison and

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Boyd to use the 2-substituted-4,5-benzoindan-3-one as well as the 2-substituted-4,5-benzoindan-1-one in Rohrmann's process based on the teaching of Morrison and Boyd.

4. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 549,900 to Rohrmann in view of US patent 4,528,408 to Plummer, and "Organic Chemistry" by Morrison and Boyd as applied to claims 1-11 above.

2. Plummer discloses a process according to the instant claims where a ketone is reacted with a reducing agent, an ether and a source of hydrogen to produce the corresponding alcohol. Plummer further discloses the use of lithium aluminum hydride as the reducing agent, THF as the ether in the reaction mixture and water as a source of hydrogen or OH containing compound (col 6, lines 56-64). Plummer does not disclose the use of sodium borohydride as the reducing agent. Plummer's process also differs from the instant process in the use of a specific ketone. Plummer discloses a 2,3-disubstituted indanone (col 6, line 36) whereas the instant invention uses a 2-substituted-4,5-benzoindanone. Rohrmann discloses a process where a 2-substituted-4,5-benzoindanone is reduced to the corresponding alcohol using an inert solvent such as THF or diethylether and a reducing agent of such as lithium aluminum hydride or sodium borohydride (pg 10 line 34 and pg 11 lines 1-2). Morrison and Boyd in their textbook "Organic Chemistry" (page 630,636) teach that after reduction of a ketone by either lithium aluminum hydride or sodium borohydride there should be a source of hydrogen to produce the alcohol and that one source can be water. It would be obvious to anyone skilled in the art at the time of the instant invention to use the 2-substituted-4,5-benzoindanone of Rohrmann in place of the substituted

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indanone of the Plummer's process since both compounds are cyclic ketones. It would further be obvious to anyone skilled in the art in view of Morrison and Boyd (page 630,636) to use sodium borohydride in place of lithium aluminum hydride as the reducing agent in the Plummer's process since both are equate as reducing agents as far as ketone reduction is concerned..

Rohrmann (line 6, page 11) discloses the use of catalytic arylsulfonic acid namely p-toluene sulfonic acid to cause the formation of a 4,5-benzoindene (schematic diagram on page 9).

Rohrmann (pg 13 line 8-9) also discloses the use of separating the ether and the water from the reaction prior to catalytic dehydration. Rohrmann does not disclose the use of the 2-substituted-4,5-benzoindanol since his starting material is the 2-substituted-4,5-benzoindanone but he performs a two step process in one pot in which he first reacts the 2-substituted-4,5-benzoindanone with a reducing agent obtaining an oil and then uses the arylsulfonic acid with this oil intermediate to form the benzoindene. Plummer and Morrison and Boyd have shown that the result of reacting a ketone with sodium borohydride is to form an alcohol so it is clearly obvious to anyone skilled in the art that Rohrmann (schematic diagram on pg 8) first formed the 2-substituted-4,5-benzoindanol which is the oil intermediate and then dehydrated the alcohol (oil) with an arylsulfonic acid to form the benzoindene in a two step one pot reaction.

5. Claims 16-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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6. Claims 21-25 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 549,900 to Rohrmann in view of US patent 4,528,408 to Plummer, and "Organic Chemistry" by Morrison and Boyd as applied to claims 1-15 above.

Rohrmann (pg 8 schematic diagram (H) and page 9 lines 22-26) discloses a process with the use of a strong base, an alkyl lithium, to deprotonate the 4,5-benzoindene, and the subsequent reaction with a diorgano dihalo silicon, germanium or tin compound to form complex with the 4,5-benzoindene. The previous disclosure by Rohrmann would be the basis of a 35 U.S.C.102 rejection for claim 21 and 30 if the formation of the tin, germanium or silicon complex in the instant claim stood alone in claim 21. However the previous disclosure of Rohrmann applies to only one of three parts of claim 21 and therefore the other two parts (1 and 2) render claims 21-25 and 30 rejected under 35 U.S.C. 103(a). The reasons for the 103 rejection are as follows:

Plummer discloses a process according to the instant claims where a ketone is reacted with a reducing agent, an ether and a source of hydrogen to produce the corresponding alcohol.

Plummer further discloses the use of lithium aluminum hydride as the reducing agent, THF as the ether in the reaction mixture and water as a source of hydrogen or OH containing compound (col 6, lines 56-64). Plummer does not disclose the use of sodium borohydride as the reducing agent.

Plummer's process also differs from the instant process in the use of a specific ketone. Plummer discloses a 2,3-disubstituted indanone (col 6, line 36) whereas the instant invention uses a 2-substituted-4,5-benzoindanone. Rohrmann discloses a process where a 2-substituted-4,5-benzoindanone is reduced to the corresponding alcohol using an inert solvent such as THF or

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diethylether and a reducing agent of such as lithium aluminum hydride or sodium borohydride (pg 10 line 34 and pg11 lines1-2). Morrison and Boyd in their textbook " Organic Chemistry"(page 630,636) teach that after reduction of a ketone by either lithium aluminum hydride or sodium borohydride there should be a source of hydrogen to produce the alcohol and that one source can be water. It would be obvious to anyone skilled in the art at the time of the instant invention to use the 2-substituted-4,5-benzoindanone of Rohrmann in place of the substituted indanone of the Plummer's process since both compounds are cyclic ketones. It would further be obvious to anyone skilled in the art in view of Morrison and Boyd to use sodium borohydride in place of lithium aluminum hydride as the reducing agent in the Plummer's process since both are equate as reducing agents as far as ketone reduction is concerned. Rohrmann (line 6, page 11) discloses the use of catalytic arylsulfonic acid namely p-toluene sulfonic acid to cause the formation of a 4,5-benzoindene (schematic diagram on page 9). Rohrmann (pg 13 line 8-9) also discloses the use of separating the ether and the water from the reaction prior to catalytic dehydration. Rohrmann does not disclose the use of the 2-substituted-4,5-benzoindanol since his starting material is the 2-substituted-4,5-benzoindanone but he performs a two step process in one pot in which he first reacts the 2-substituted-4,5-benzoindanone with a reducing agent obtaining an oil and then uses the arylsulfonic acid with this oil intermediate to form the benzoindene. Plummer and Morrison and Boyd (page 630,636) have shown that the result of reacting a ketone with sodium borohydride is to form an alcohol so it is clearly obvious to anyone skilled in the art that Rohrmann (schematic diagram on pg 8) first

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formed the 2-substituted-4,5-benzoindanol which is the oil intermediate and then dehydrated the alcohol (oil) with an arylsulfonic acid to form the benzoindene in a two step one pot reaction.

7. Claims 26-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 31-35 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 549,900 to Rohrmann in view of US patent 4,528,408 to Plummer and "Organic Chemistry" by Morrison and Boyd as applied to claims 1-15, 21-25 and 30.

Rohrmann (schematic diagram page 8 (J-K) and page 9, lines 28-31) discloses deprotonating the bridged complex with a strong base and reacting the deprotonated intermediate with a Group IV, V, or VI metal tetra halide to form a silicon, germanium- or tin bridged metallocene complex. Rohrmann (pg 8 schematic diagram (H) and page 9 lines 22-26) also discloses a process with the use of a strong base, an alkyl lithium, to deprotonate the 4,5-benzoindene, and the subsequent reaction with a diorgano dihalo silicon, germanium or tin compound to form complex with the 4,5-benzoindene. The previous disclosures by Rohrmann would be the basis of a 35 U.S.C.102 rejection of claims 31-35 and 40 if the preparation of the tin, germanium or silicon bridged complex and the subsequent deprotonation of the bridged complex and reaction of the intermediate with a Group IV, V, or VI metal tetra halide stood alone in claim 31 however since these two disclosures are only two of four parts of the claim the other two parts (1 and 2) render the claims 31- 35 and 40 rejected under 35 U.S.C. 103(a). The

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reasons for the 103(a) rejection are described as follows: Plummer discloses a process according to the instant claims where a ketone is reacted with a reducing agent, an ether and a source of hydrogen to produce the corresponding alcohol. Plummer further discloses the use of lithium aluminum hydride as the reducing agent, THF as the ether in the reaction mixture and water as a source of hydrogen or OH containing compound (col 6, lines 56-64). Plummer does not disclose the use of sodium borohydride as the reducing agent. Plummer's process also differs from the instant process in the use of a specific ketone. Plummer discloses a 2,3-disubstituted indanone (col 6, line 36) whereas the instant invention uses a 2-substituted-4,5-benzoindanone. Rohrmann discloses a process where a 2-substituted-4,5-benzoindanone is reduced to the corresponding alcohol using an inert solvent such as THF or diethylether and a reducing agent of such as lithium aluminum hydride or sodium borohydride (pg 10 line 34 and pg11 lines1-2). Morrison and Boyd in their textbook " Organic Chemistry"(page 630,636) teach that after reduction of a ketone by either lithium aluminum hydride or sodium borohydride there should be a source of hydrogen to produce the alcohol and that one source can be water. It would be obvious to anyone skilled in the art at the time of the instant invention to use the 2-substituted-4,5-benzoindanone of Rohrmann in place of the substituted indanone of the Plummer's process since both compounds are cyclic ketones. It would further be obvious to anyone skilled in the art in view of Morrison and Boyd (630,636) to use sodium borohydride in place of lithium aluminum hydride as the reducing agent in the Plummer's process since both are equate as reducing agents as far as ketone reduction is concerned. Rohrmann (line 6, page 11) discloses the use of catalytic arylsulfonic

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acid namely p-toluene sulfonic acid to cause the formation of a 4,5-benzoindene (schematic diagram on page 9). Rohrmann (pg 13 line 8-9) also discloses the use of separating the ether and the water from the reaction prior to catalytic dehydration. Rohrmann does not disclose the use of the 2-substituted-4,5-benzoindanol since his starting material is the 2-substituted-4,5-benzoindanone but he performs a two step process in one pot in which he first reacts the 2-substituted-4,5-benzoindanone with a reducing agent obtaining an oil and then uses the arylsulfonic acid with this oil intermediate to form the benzoindene. Plummer and Morrison and Boyd have shown that the result of reacting a ketone with sodium borohydride is to form an alcohol so it is clearly obvious to anyone skilled in the art that Rohrmann (schematic diagram on pg 8) first formed the 2-substituted-4,5-benzoindanol which is the oil intermediate and then dehydrated the alcohol (oil) with an arylsulfonic acid to form the benzoindene in a two step one pot reaction.

Claims 36-~~39~~ are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 41-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 549,900 to Rohrmann in view of EP 659,757 to Winter. Rohrmann (pg 8 schematic diagram (H) and page 9 lines 22-26) discloses a process with the use of a strong base, an alkyl lithium, to deprotonate the 4,5-benzoindene, and the subsequent reaction in an ether (THF) with a diorgano dihalo silicon, germanium, or tin compound to form a bridged complex with the 4,5-

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benzoindene. Rohrmann does not disclose separating the solids from the liquid phase by filtration, centrifugation, or decanting however it would be obvious to anyone skilled in the art to use these techniques as they are inherent in the art. Winter discloses (pg 14, line 25) the reaction of a 2 alkyl-4,5-benzoindene deprotonated by a strong base, alkyl lithium, in a mixture of toluene and diethyl ether reacting with a dialkyl dihalo silicon to form a bridged complex. Winter does not disclose the use of an ether as the sole solvent in the reaction. Rohrmann (pg 8 schematic diagram (H) and page 9 lines 22-26) discloses a process with the use of a strong base, an alkyl lithium, to deprotonate the 4,5-benzoindene, and the subsequent reaction with a diorgano dihalo silicon, germanium, or tin compound to form a bridged complex with the 4,5-benzoindene using an ether (THF) as the sole solvent . Since the reaction proceeds in either ether, it would have been obvious to anyone skilled in the art to take the dialkyl ether used by Winter and use it in process disclosed by Rohrmann.

9. Claims 46-48 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

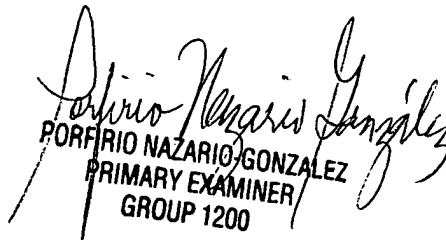
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean F. Vollano whose telephone number is (703) 305-4483. The examiner can normally be reached on Monday - Friday from 6:30 to 3:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Geist, can be reached on (703) 308-1701. The fax phone number for this Group is (703) 308-4556.


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PRIMARY EXAMINER
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